

ABSTRACT

Improvements in the production of high-performance latching magneto-optic garnet materials are provided. It has been recognized that high-Europium magneto-optic garnets will offer superior properties in devices such as isolators, circulators and interleavers. However, formation of, e.g., $(\text{BiEu})_3(\text{FeGa})_5\text{O}_{12}$ on conventional, congruent composition, garnet substrates is difficult, due to poor lattice matching between the magneto-optic garnet and such conventional substrates. The invention addresses this problem, by utilizing a single crystal substrate composed essentially of a solid solution of two or more garnet materials. By use of a solid solution of two or more garnets, e.g., two congruent garnet compositions, an acceptable lattice parameter is able to be attained.

Useful solid solutions include gadolinium scandium gallium garnet and gadolinium scandium aluminum garnet, or gadolinium scandium gallium garnet and terbium scandium gallium garnet.